REMARKS

Applicants request favorable reconsideration of this application in view of the foregoing amendments and the following remarks. Claims 1-8 were pending in the application. Claims 1, 2, 4, 5, 7 and 8 were rejected in the Office Action. Applicants appreciate the allowance of claims 3 and 6. Claims 1, 2, 4, 5, 7, and 8 have been amended. Claims 9 and 10 have been added. No new matter has been added.

1. **Rejection of Claims 1, 2 and 5**

The Examiner rejects claims 1, 2 and 5 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,224,460 ("Havstad"). Preliminary, claim 2 has been amended to depend from allowed claim 3. Accordingly, the rejection of claim 2 is now moot. With respect to claims 1 and 5, to the extent the rejection still applies to these claims, as amended, Applicants respectfully traverse the rejection.

Claims 1 and 5 both recite: "damping an operating signal for the intake valve relative to demand on the engine, for unthrottled intake air control." By "damping" it is meant that the engine torque gradually rises, in a manner which is neither step-like nor ramp-like, from a first level to a second level at which the response plateaus. *See* Figures 11B, 11C. By way of contrast, a linear response is shown in Figure 11A in which a steep linear response is followed by a linear plateau.

It is to be appreciated that Figure 11A depicts the vehicle accelerator position opening (VAPO) as monitored by the accelerator sensor 52 coupled to the accelerator 50 (Figure 1) versus *time*. Further Figures 11B and 11C depict the cylinder air charge versus *time* (Figure 11B) and engine torque versus *time* (Figure 11C). The variable valve disclosed in Havstad does not respond to changes in demand in a damped fashion. Rather, the valve disclosed in Havstad opens and closes with a phase shift, relative to acceleration demand.

Although Havstad teaches a phase shift, Havstad does not teach a dampened response relative to demand on the engine. Accordingly, as Havstad fails to teach or suggest "damping an operating signal for the intake valve relative to demand on the engine, for unthrottled intake air control," it can not be used to anticipate either claim 1 or claim 5 under § 102(b). Therefore, as Havstad fails to teach or suggest each of the limitations of claims 1 and 5, Applicants respectfully solicit a withdrawal of the rejection of these claims under § 102(b).

2. Rejection of Claims 4, 7, and 8

The Examiner rejects claims 4, 7, and 8 under 35 U.S.C. § 103(a) as being obvious when considering Havstad in view of U.S. Patent No. 6,286,478 ("Atago"). Preliminary, claim 4 has been amended to depend from allowed claim 3. Accordingly, the rejection of claim 4 is now moot. With respect to claims 7 and 8, to the extent the rejection still applies to these claims, as amended, Applicants respectfully traverse the rejection.

Claims 7 and 8, as amended, recite: "wherein the intake valve is closed in a dampened fashion in response to a change in demand on the engine." As previously explained in detail, Havstad fails to teach or suggest closing the intake valve in a dampened fashion in response to a change in demand on the engine. Rather, the linear response taught by Havstad is phase shifted in time with respect to the change in demand. Unlike the previous quoted limitation of claims 7 and 8, Atago teaches:

> A target air flow operating unit 4 operates to determine a target air flow . . . Then, a target ETC opening angle operating unit 45 serves to operate a target ETC opening angle from the target air flow. Based on the target air flow, a target electromagnetic valve opening and closing timing operating unit 46 serves to operate the opening and closing timing of the electromagnetic intake valve required for achieving the target air flow.

See col. 6, lines 15-26. There is no mention of a dampened response in Atago. Accordingly, Atago fails to cure the deficiencies of Havstad. Therefore, as the combination of Havstad and Atago fails to teach or suggest each of the limitations of claims 7 and 8, as amended, it can not be used to reject the claims under § 103(a). Further, as claims 7 and 8 are allowable over the combination of references, Applicants earnestly solicit a withdrawal of the rejection of these claims under § 103(a).

CONCLUSION

For the reasons stated above, claims 1-10 are now in condition for allowance. A Notice of Allowance at an early date is respectfully requested. The Examiner is invited to contact the undersigned if such communication would expedite the prosecution of the application.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

In accordance with 37 C.F.R. §1.121(b)(1), please amend the specification by substituting the following paragraphs for the corresponding paragraphs originally filed, as indicated below.

Please replace the paragraph starting on page 2, line 20 and ending on page 2, line 29 with the following:

Unthrottling intake air control is satisfactory. However, it cannot control cylinder air charge satisfactorily in a certain operation range. In such operation range, throttling of intake air by a throttle valve is needed. In such case, care must be taken to provide a smooth [take over] transition during the transient period from the unthrottled control to the throttled control or vice versa without any shock due to a torque change. Undesired torque change might take place during such transient period due mainly to a considerable difference in response performance between the two controls.

Please replace the paragraph starting on page 7, line 13 and ending on page 7, line 30 with the following:

MPU 106 communicates with various actuators of engine 12 via output ports 118. Actuators may control ignition timing or spark SPK, timing and metering of fuel FIN, position of throttle valve TVA to control air inflow, intake valve timing (IVT) to control intake air into the combustion chamber and exhaust valve timing (EVT). In the operation range where throttled intake air control is required, the position of throttle valve 44 is variably adjusted by an actuator in the form of a motor 45 to control intake air into combustion chamber 16 and intake valve closure (IVC) timing is adjusted by EMD 86 to provide a valve opening duration in the neighborhood of the least duration. In the operation range where unthrottled intake air control is required, IVC control is performed and the position of throttle valve 44 [to] is adjusted so as to maintain boost pressure within the intake manifold at a target negative pressure value. In IVC control, intake valve closure (IVC) timing is variably adjusted to control intake air into the combustion chamber 16 without relying on throttling of airflow by throttle valve 44.

Please replace the paragraph starting on page 8, line 25 and ending on page 8, line 30 with the following:

In the preferred embodiment, MPU 106 executes instructions stored in computer-readable media 110 to carry out a method for intake air control to communicate with the EMD 34 [of] for intake valve 32 and the motor 45 for throttle valve 44 for unthrottled intake air control in coordination with throttled intake air control.

IN THE CLAIMS:

In accordance with 37 C.F.R. §1.121(c)(1), please substitute for original claims 1, 2, 4, 5, 7, and 8 the following rewritten versions of the same claims, as amended.

1. (Amended) A method for controlling intake air of an internal combustion engine, the engine having at least one combustion chamber provided with an intake [means] valve together with an intake manifold provided with a throttle valve, wherein the opening and closure timings of the intake [means] valve are adjustable [entirely] independently from [the] a crankshaft position to control the amount of intake air supplied to the combustion chamber, the method comprising:

damping an operating signal for the intake valve relative to demand on the engine, [providing a response adjustment to variable valve timing control of the intake means] for unthrottled intake air control.

2. (Amended) The method as claimed in claim [1] 3, wherein the step of providing [said] the response adjustment comprises:

providing an engine response performance during unthrottled intake air control as much as an engine response performance during throttled intake air control.

4. (Amended) The method as claimed in claim [1] 3, further comprising:

determining a first operation variable indicative of a target intake air;

determining a second operation variable indicative of a target valve timing based on [said] the first operation variable;

wherein the step of providing [said] the response adjustment comprises:

processing [said] the second operation variable to cause [said] the response adjustment.

5. (Amended) A system for controlling intake air of an internal combustion engine, the engine having at least one combustion chamber provided with an intake [means] valve together with an intake manifold provided with a throttle valve, wherein the opening and closure timings of the intake [means] valve are adjustable [entirely] independently from [the] a crankshaft position to control the amount of intake air supplied to the combustion chamber, the [method] system comprising:

a control for [a response adjustment to variable valve timing control of the intake means] damping an operating signal for the intake valve relative to demand on the engine, for unthrottled intake air control.

7. (Amended) A method for controlling of intake air of an internal combustion engine, the engine having at least one combustion chamber provided with an intake [means] valve together with an intake line having variable flow area dimensions, outside of the intake [means] valve, determined by a throttle, wherein the opening and closure timings of the intake [means] valve are adjustable [entirely] independently from [the] a crankshaft position to control the amount of intake air supplied to the combustion chamber, the method comprising:

determining a first operation [parameter] variable indicative of target intake air;

determining a second operation [parameter] variable indicative of a preliminary valve closure timing for unthrottled intake air control based on the first operation variable;

processing [said] the second operation [parameter] variable to provide a response adjustment to give a processed second [parameter] operation variable;

varying the valve closure timing of the intake [means] valve to close the intake [means] valve at a valve closure timing indicated by [said] the processed second operation variable,

wherein the intake valve is closed in a dampened fashion in response to a change in demand on the engine.

8. (Amended) A computer readable storage medium having stored therein data representing instructions executable by a computer to implement unthrottled control of intake air of an internal combustion engine, the engine having at least one combustion chamber provided with an intake [means] valve, wherein the opening and closing times of the intake [means] valve are adjustable [entirely] independently from [the] a crankshaft position to control the amount of intake air supplied to the combustion chamber, the computer readable storage medium comprising:

instructions for determining a first operation [parameter] variable indicative of target intake air;

instructions for determining a second operation [parameter] variable indicative of a preliminary valve closure timing for unthrottled intake air control based on the first operation variable;

instructions for processing [said] the second operation [parameter] variable to provide a response adjustment to give a processed second [parameter] operation variable;

instructions for varying the valve closure timing of the intake [means] valve to close the intake [means] valve at a valve closure timing indicated by [said] the processed second operation variable,

wherein the intake valve is closed in a dampened fashion in response to a change in demand on the engine.